SYNTEGRA CONSULTING

39A Fitzjohn Avenue and Land adjacent to 46 Maresfield Gardens London NW3 5JY

Air Quality Assessment

January 2024

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Prepared by	M Chapman	M Chapman
Checked by	M Chapman	M Chapman
Authorised by	M Chapman	M Chapman

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1. Introduction

Background

This Air Quality Assessment has been prepared by Syntegra Consulting submitted to the London Borough of Camden (the Council) for the redevelopment of site to provide two townhouses and two maisonettes (proposed development) at 39A Fitzjohn Avenue, London, NW3 5JY and a new mansion style block for 29 apartments (proposed development) at land adjacent to 46 Maresfield Gardens, London, NW3 5TF (the Site).

This Air Quality Assessment provides the Council with information relating to local air quality exposure and impacts relating to the development.

Site Location and Context

The site is located at 39A Fitzjohn Avenue, London, NW3 5JY at Ordnance Survey (OS) National Grid Reference (NGR) 526548, 185001 and land adjacent to 46 Maresfield Gardens, London, NW3 5TF at Ordnance Survey (OS) National Grid Reference (NGR) 526468, 185040.

The proposed development has the potential to cause impacts at sensitive locations. These may include fugitive dust emissions associated with construction works and road traffic exhaust emissions from vehicles travelling to and from the site during the operational phase. Further to this, the proposals may introduce future occupants to any existing air quality issues at the site. An air quality assessment was therefore undertaken to determine baseline conditions, consider location suitability for the proposed end-use and consider potential effects because of the proposals. This is detailed in the following report.

2. Legislation and Policy

UK Legislation

The Air Quality Standards Regulations (2010) came into force on 11th June 2010 and include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen Dioxide (NO_2);
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Particulate matter with an aerodynamic diameter of less than 2.5µm;
- Benzene; and,
- Carbon monoxide.

Target Values were also provided for an additional 5 pollutants. These include:

- Ozone;
- Arsenic;
- Cadmium;
- Nickel; and,
- Benzo(a)pyrene.

Part IV of the Environment Act (1995) requires UK Government to produce a national Air Quality Strategy (AQS) which contains standards, objectives, and measures for improving ambient air quality. The most recent AQS was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007[1]. The AQS sets out Air Quality Objectives (AQOs) that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedances over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

Table 1 presents the AQOs for pollutants considered within this assessment.

Table 1: Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration (µg/m^3)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum

Table 2 summarises the advice provided in DEFRA guidance[2] on where the AQOs for pollutants considered within this report apply.

[1] The AQS for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.
[2] Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

Table 2: Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

Local Air Quality Management

Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This Review and Assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan, the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

Dust Legislation

The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

> *"Any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."*

Enforcement of the Act, regarding nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). Enforcement can insist that there be no dust beyond the boundary of the works. The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practicable means.

National Planning Policy

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied.

The purpose of the planning system is to contribute to the achievement of sustainable development. To ensure this, the NPPF recognises 3 overarching objectives, including the following of relevance to air quality:

> *"c) An environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."*

Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> *[…]*
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality […]"*

The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

> *"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement.*
> *So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local Air Quality Action Plan."*

The implications of the NPPF have been considered throughout this assessment.

National Planning Practice Guidance

The National Planning Practice Guidance[3] (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 and updated on 1st November 2019 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

Local Planning Policy

<u>The London Plan</u>

The London Pan 2021 is the Spatial Development Strategy for Greater London. It sets out a framework for how London will develop over the next 20-25 years and the Mayor's vision for Good Growth. The Plan is part of the statutory development plan for London, meaning that the policies in the Plan should inform decisions on planning applications across the capital. Borough's Local Plans must be in 'general conformity' with the London Plan, ensuring that the planning system for London operated in a joined-up way and reflects the overall strategy for how London can develop sustainably, which the London Plan sets out.

The following policy is relevant to this assessment:

"Policy S1 1 Improving Air Quality

A. Development Plans, through relevant strategic, site specific and area-based policies, should seek opportunities to identify and deliver further improvements to air quality and should not reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality.

B. To tackle poor air quality, protect health and meet legal obligations the following criteria should be addressed:

[3] https://www.gov.uk/guidance/air-quality--3.

a. *Development proposals should not:*

i. *lead to further deterioration of existing poor air quality*

ii. *create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits*

iii. *create unacceptable risk of high levels of exposure to poor air quality.*

b. *To meet the requirements in Part 1, as a minimum:*

i. *development proposals must be at least Air Quality Neutral*

ii. *development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retrofitted mitigation measures*

iii. *major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1*

iv. *development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people should demonstrate that design measures have been used to minimise exposure.*

C. *Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should consider how local air quality can be improved across the area of the proposal as part of an air quality positive approach. To achieve this a statement should be submitted demonstrating:*

a. *how proposals have considered ways to maximise benefits to local air quality, and*

b. *what measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this.*

D. *In order to reduce the impact on air quality during the construction and demolition phase development proposals must demonstrate how they plan to comply with the Non-Road Mobile Machinery Low Emission Zone and reduce emissions from the demolition and construction of buildings following best practice guidance4.*

E. *Development proposals should ensure that where emissions need to be reduced to meet the requirements of Air Quality Neutral or to make the impact of development on local air quality acceptable, this is done on site.*

[4] The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, Mayor of London, 2014

Where it can be demonstrated that emissions cannot be further reduced by on site measures, off site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated within the area affected by the development."

The Local Plan

The Camden Local Plan[5] was adopted in 2017 and sets out the vision, objectives and related strategic policies for the borough up to 2031.

A review of the document indicated the following policies in relation to air quality which are relevant to this assessment:

*"**Policy A1 – Manging the Impact of Development***

The Council will seek to protect the quality of life of occupiers and neighbours. We will grant permission for development unless this causes unacceptable harm to amenity. We will […] a. require mitigation where necessary.

Policy CC4 – Air Quality

The council will ensure that the impact of development on air quality is mitigated and ensure that exposure to poor air quality is reduced in the borough.

The Council will take int account the impact of air quality when assessing development proposals, through the consideration of both the exposure of occupants to air pollution and the effect of the development on air quality. Consideration must be taken to the actions identified in the Council's Air Quality Action Plan.

Air Quality Assessments are required where development is likely to expose residents to high levels of air pollution. Where the AQA shows that a development would cause hard to air quality, the Council will not grant planning permission unless measures are adopted to mitigate the impact. Similarly, developments that introduce sensitive receptors (i.e. housing, schools) in locations of poor air quality will not be acceptable unless designed to mitigate the impact.

The London Borough of Camden has also published their own planning guidance[6] which provides information of air quality in the borough and supports Local Plan Policy CC4 'Air Quality'.

The Camden Clean Air Strategy 2019-2034 is the overarching vision for clean air in the borough. The Strategy is a framework to:

- Improve air quality throughout the borough of Camden, meeting the World Health Organization air quality guideline limits everywhere in Camden by 2034;
- Tackle the disproportionate and inequitable impact of air pollution in Camden.

[5] London Borough of Camden, 2017 *Camden Local Plan 2016-2031*
[6] London Borough of Camden, 2021 *Camden Planning Guidance, Air Quality*

The Camden Clean Air Action Plan 2023-2026 is the Council's short-to-medium term plan for working towards the strategic objectives as described in the Camden Clean Air Strategy 2019-2034. The 36 Clean Air Outcomes defined in the Action plan can be grouped into seven broadly defined themes:

1. Construction and development
2. Buildings
3. Transport
4. Communities and schools
5. Indirect emissions and lobbying
6. Public health and awareness
7. Indoor air quality and occupational exposure

The implications of these policies and guidance were taken into consideration throughout the undertaking of the assessment.

3. Baseline

Existing air quality conditions in the vicinity of the proposed development site were identified to provide a baseline for the assessment. These are detailed in the following Sections.

Local Air Quality Management

As required by the Environment Act (1995), the council has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO_2 and the 24-hour mean of PM_{10} is above the relevant AQOs at some locations. As such, one AQMA have been declared. This is described as follows:

"The whole borough"

The development is located within the AQMA. As such, there is the potential for vehicles travelling to and from the site to increase pollution levels in this sensitive area, as well as the exposure of future residents to poor air quality. These issues have been considered throughout the assessment.

The council has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs.

Air Quality Focus Area

In 2016, 183 Air Quality Focus Areas (AQFAs) were defined across London in locations where the EU annual mean limit value for NO_2 was exceeded and there was high human exposure. These were not designed to be an exhaustive list of London's air pollution hotspots, but where the problem most acute. The Focus Areas have been used by Greater London Authority (GLA), TfL and the boroughs to inform LAQM, the development of air quality interventions and the planning process. Under London LAQM guidelines, boroughs are required to have regard to the Focus Areas in their borough when devising their air quality action plans.

The development is not located within an AQFA but lies adjacent to the '*Swill Cottage from South Hamstead to Finchley Road Station'* AQFA.

Air Quality Monitoring

Monitoring of pollutant concentrations is undertaken by the council throughout their area of jurisdiction. The London Borough of Camden monitor NO2 at 314 locations within its jurisdiction, 9 of which are within 500m of the development site. Annual mean NO_2 results recorded in the vicinity of the development taken from readily available information online are shown in Table 3. Exceedances of the relevant AQOs are shown in **bold.**

Table 3: Monitoring Results - NO_2

Monitoring Site		Distance to Site (m)	Monitor Type	Monitored NO_2 Concentration (µg/m^3)				
				2018	2019	2020	2021	2022
CAM76	47 Fitzjohn's Road	94	DT Roadside	**48.13**	**43.51**	34.47	29.75	27.61
CAM6	South Hampstead High School Junior School	128	DT Roadside	-	31.65	23.55	22.37	20.39

Monitoring Site		Distance to Site (m)	Monitor Type	Monitored NO_2 Concentration (µg/m^3)				
				2018	2019	2020	2021	2022
CAM7	Devonshire House Preparatory School	382	DT Roadside	-	39.50	30.61	29.19	28.31
CAM8	University College School Senior School	398	DT Roadside	-	29.75	22.69	22.00	19.85
CAM20	Lyndhurst House Prep - Lyndhurst Gardens	397	DT Roadside	-	-	-	19.56	19.00
CAM21	Lyndhurst House Prep - Wedderburn Road	410	DT Roadside	-	-	-	19.26	19.03
CAM111*	Belsize Park/Swiss Cottage 1 - Maresfield Gardens/Nutley Terrace	21	DT Roadside	-	27.57	-	-	-
CAM112*	Belsize Park/Swiss Cottage 2 - Belsize Lane /Fitzjohn's Avenue	383	DT Roadside	-	**40.11**	-	-	-
CAM118*	Belsize Park/Swiss Cottage 8 - Belsize Avenue/Belsize Park Gardens	392	DT Roadside	-	31.92	-	-	-

Table notes:
DT = Diffusion Tube
Exceedances of the relevant AQO are shown in **bold**
* = diffusion tube monitoring was undertaken by a community project and not directly by the Council

As shown in Table 3, there are nine monitoring sites within 500m of the proposed development site. NO_2 concentrations at the site were above the relevant AQO (40µg/m^3) in 2019 at one of the monitoring locations. The table shows NO_2 concentrations have been decreasing in recent years.

PM10 monitoring is not undertaken in the vicinity of the proposed development.

Background Pollutant Concentrations

Predictions of background pollutant concentrations on a 1km-by-1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is in grid square NGR: 526500, 185000. Data for this location was downloaded from the DEFRA website[7] for the purpose of this assessment and is summarised in Table 4.

Table 4: Background Pollutant Concentrations

Pollutant	Predicted Background Concentration (µg/m^3)		
	2019	2025	2030
NO_2	26.3	21.6	20.5
PM_{10}	17.9	16.3	16.3

As shown in Table 4, predicted background NO_2 and PM_{10} concentrations are well below the relevant AQOs at the development site and expected to reduce in future years.

[7] http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018.

London Atmospheric Emissions Inventory

The London Atmospheric Emissions Inventory (LAEI) provides the results of pollutant dispersion modelling undertaken for the geographical area inside of the M25 motorway that takes into account emissions arising from a range of sources including transport, aviation, railways, domestic heating etc, not just background concentrations. The latest version of the LAEI was released in April 2023.

The LAEI includes modelled ground level concentrations of key pollutants (NO_2 and particulate matter, PM_{10} and $PM_{2.5}$) for the Greater London area (up to the M25 motorway) at a grid resolution of 20m-by-20m. Emissions estimates of key pollutants are included for the base year 2019 and forecast years 2025 and 2030.

The proposed development site is in grid square NGR: 526540, 185000. Data for this location was downloaded from the LAEI website[8] for the purpose of this assessment and is summarised in Table 5.

Table 5: London Atmospheric Emissions Inventory Concentrations (Fitzjohn Avenue)

Pollutant	Predicted Background Concentration (µg/m³)		
	2019	2025	2030
NO_2	36.5	22.2	17.8
PM_{10}	18.2	15.9	14.9

Table 6: London Atmospheric Emissions Inventory Concentrations (Maresfield Gardens)

Pollutant	Predicted Background Concentration (µg/m³)		
	2019	2025	2030
NO_2	31.7	21.9	17.5
PM_{10}	16.9	15.8	14.8

As shown in Table 5 and Table 6, predicted LAEI NO_2 and PM_{10} concentrations are below the relevant AQOs at the development site.

Sensitive Receptors

A sensitive receptor is defined as any location which may be affected by changes in air quality because of a development. These have been defined for dust and road vehicle exhaust emission impacts in the following Sections.

[8] https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory--laei--2019

4. Methodology

Introduction

The proposed development has the potential to cause air quality impacts during the construction and operational phases, as well as expose future occupants to elevated pollution levels. These factors were assessed in accordance with the following methodology.

Construction Phase Fugitive Dust Emissions

There is the potential for fugitive dust emissions to occur because of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V1.1'[9]

Activities on the proposed construction site have been divided into 4 types to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and,
- Trackout.

The potential for dust emissions was assessed for each activity that is likely to take place and considered 3 separate dust effects:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of health effects due to a significant increase in exposure to PM_{10}.

The assessment steps are detailed below.

Step 1

Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m of the boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or the construction vehicle route, then the assessment also proceeds to Step 2.

Should sensitive receptors not be present within the relevant distances then **negligible** impacts would be expected and further assessment is not necessary.

[9] Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2014

Step 2

Step 2 assesses the risk of potential dust impacts. A site is allocated a risk category based on 2 factors:

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium, or large (Step 2A); and,
- The sensitivity of the area to dust impacts, which can be defined as low, medium, or high sensitivity (Step 2B).

The 2 factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.

Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table 7.

Table 7: Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	Total building volume >50,000 m^3, Potentially dusty construction material (e.g., concrete), On-site crushing and screening, Demolition activities >20 m above ground level.
	Earthworks	Total site area >10,000 m^2, Potentially dusty soil type (e.g., clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, Formation of bunds >8 m in height, Total material moved >100,000 tonnes.
	Construction	Total building volume >100,000 m^3, On site concrete batching, Sandblasting.
	Trackout	>50 HDV (>3.5t) maximum outward movements (a one-way journey. i.e., from A to B, and excludes the return journey) in any one day, Potentially dusty surface material (e.g., high clay content), Unpaved road length >100m.
Medium	Demolition	Total building volume 20,000 m^3 - 50,000 m^3, Potentially dusty construction material, Demolition activities 10-20 m above ground level.
	Earthworks	Total site area 2,500 m^2 – 10,000 m^2, Moderately dusty soil type (e.g., silt), 5-10 heavy earth moving vehicles active at any one time, Formation of bunds 4m - 8m in height, Total material moved between 20,000 tonnes – 100,000 tonnes.
	Construction	Total building volume 25,000 m^3 to 100,000 m^3, Potentially dusty construction material (e.g., concrete), On site concrete batching.
	Trackout	10-50 HDV (>3.5t) maximum outward movements (a one-way journey. i.e., from A to B, and excludes the return journey) in any one day, Moderately dusty surface material (e.g., high clay content), Unpaved road length 50m - 100m.
Small	Demolition	Total building volume <20,000 m^3, Construction material with low potential for dust release (e.g., metal cladding or timber), Demolition activities <10 m above ground, Demolition during wetter months.

Magnitude	Activity	Criteria
	Earthworks	Total site area <2,500 m^2, Soil type with large grain size (e.g., sand), <5 heavy earth moving vehicles active at any one time, Formation of bunds <4 m in height, Total material moved <20,000 tonnes, Earthworks during wetter months.
	Construction	Total building volume less than 25,000 m^3, Construction material with low potential for dust release (e.g., metal cladding or timber).
	Trackout	<10 HDV (>3.5t) maximum outward movements (a one-way journey. i.e., from A to B, and excludes the return journey) in any one day, Surface material with a low potential for dust release, Unpaved road length <50m.

Step 2B defines the sensitivity of the area around the development to potential dust impacts. The influencing factors are shown in Table 8.

Table 8: Construction Dust - Examples of Factors Defining Sensitivity of an Area

Receptor Sensitivity	Examples		
	Dust	Health	Ecological
High	Users can reasonably expect enjoyment of a high level of amenity; or The appearance, aesthetics or value of their property would be diminished by soiling; and The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Indicative examples include dwellings, museums and other culturally important collections, medium- and long-term car parks and car showrooms.	Locations where members of the public are exposed over a time period relevant to the air quality objective for PM10 (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	Locations with an international or national designation and the designated features may be affected by dust soiling; or Locations where there is a community of a particular dust sensitive species such as vascular species included in the Red Data List For Great Britain Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or	Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM_{10}	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown;

Receptor Sensitivity	Examples		
	Dust	Health	Ecological
Medium	The appearance, aesthetics or value of their property could be diminished by soiling; or	(in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).	Locations with a national designation where the features may be affected by dust deposition.
Small	The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Indicative examples include parks and places of work.	Indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM10, as protection is covered by Health and Safety at Work legislation.	Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.

The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and,
- Any known specific receptor sensitivities which go beyond the classifications given in the document.

These factors were considered during the undertaking of the assessment.

The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 9.

Table 9: Construction Dust - Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 250
High	More than 100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

Table 10 outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 10: Construction Dust - Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 250
High	Greater than 32µg/m^3	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m^3	More than 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28µg/m^3	More than 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	Less than 24µg/m^3	More than 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	Greater than 32µg/m^3	More than 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	28 - 32µg/m^3	More than 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	24 - 28µg/m^3	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	Less than 24µg/m^3	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Low	-	More than 1	Low	Low	Low	Low	Low

Table 11 outlines the criteria for determining the sensitivity of the area to ecological impacts.

Table 11: Construction Dust - Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	Less than 20	Less than 50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts. Table 12 outlies the risk category from demolition activities.

Table 12: Construction Dust - Dust Risk Category from Demolition Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Medium
Medium	High	Medium	Low
Low	Medium	Low	Negligible

Table 13 outlines the risk category from earthworks and construction activities.

Table 13: Construction Dust - Dust Risk Category from Earthworks and Construction Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Table 14 outlines the risk category from trackout activities.

Table 14: Construction Dust - Dust Risk Category from Trackout Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

Step 3

Step 3 requires the identification of site-specific mitigation measures within the IAQM guidance to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final Step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects using effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be **not significant**.

Operation Phase Road Vehicle Exhaust Emission Assessment

The proposed development has the potential to affect existing air quality because of road traffic exhaust emissions associated with vehicles travelling to and from the site, as well as expose future occupants to elevated pollution levels.

Potential Development Impacts

The development proposals have been screened against the IAQM indicative criteria for requiring an air quality assessment.

1. A change in Light-Duty Vehicle[10] (LDV) traffic flows on local roads with relevant receptors
   - more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA
   - more than 500 AADT elsewhere

2. A change in HDV[11] flows on local roads with relevant receptors
   - more than 25 AADT within or adjacent to an AQMA
   - more than 100 AADT elsewhere

[10] Cars and small vans <3.5t gross vehicle weight
[11] Goods vehicles + buses >3.5t gross vehicle weight

3. A change in the alignment of roads by 5m or more and the road is within an AQMA

4. Introduction of a new junction or remove an existing junction near to relevant receptors
   - Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g., traffic lights, or roundabouts.

5. Introduce or change a bus station
   - Where bus flows will change by:
     (a) more than 25 AADT within or adjacent to an AQMA
     (b) more than 100 AADT elsewhere

6. Has an underground car park with an extraction system within 20 m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).

7. Has one or more substantial combustion processes, where there is a risk of impacts at relevant receptors.
   - includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping.

Dispersion Modelling Input Data

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.0.0.1). ADMS-Roads are developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

Table 15 shows the datasets/values were used as input to the model.

Table 15: Model Input

Parameter	Value/ Source
Traffic Flow Data	2019 London Atmospheric Emissions Inventory (LAEI)
Emissions Factors	Defra Emissions Factor Toolkit (v11.0)
Meteorological Data	London City Airport. See Figure 3 for a wind rose
Surface Albedo	0.23
Surface Roughness Length	Development Site: 1.5m suitable for 'Large Urban Areas'
Monin-Obukhov Length	Development Site: 100m suitable for 'Large Conurbations >1 million'
Background Concentrations	Defra Background Pollution Concentration Maps (2018 Base)
NOx to NO2 Conversion	Defra NOx to NO2 Spreadsheet (v. 8.1)

Impact Significance

The significance of predicted air quality impacts was determined following the guidance provided within the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality'[12].

[12] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

Using this methodology impacts were defined based on the interaction between the predicted pollutant concentration in the Do Something (DS) or With Development scenario and the magnitude of change between the Do Minimum (DM) or Without Development and DS scenarios, as outlined in Table 16.

Table 16: Significance of Road Vehicle Exhaust Emissions Impact

Concentration at Receptor in Assessment Year	Predicted Concentration Change as a Proportion of AQO (%)			
	1	2 - 5	6 - 10	> 10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO	Moderate	Moderate	Substantial	Substantial
110% or more of AQO	Moderate	Substantial	Substantial	Substantial

The matrix shown in Table 16 is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell the impact falls within. It should be noted that changes of 0%, i.e., less than 0.5%, are described as **negligible**.

Following the prediction of impacts at discrete receptor locations, the IAQM document[13] provides guidance on determining the overall air quality impact significance of the operation of a development. The following factors are identified for consideration by the assessor:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

The IAQM guidance states that an assessment must conclude the likely significance of the predicted impact. It should be noted that this is a binary judgement of either it is **significant,** or it is **not significant**.

The determination of significance relies on professional judgement, and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts. The IAQM guidance[14] suggests the provision of details of the assessor's qualifications and experience. These can be provided upon request.

The London Councils guidance for air quality assessments has published the Air Pollution Exposure Criteria (APEC) specifically for new exposure to determine the significance of new exposure to poor quality and level of mitigation required. The PEC criteria are identified in Table 17.

Table 17: London Councils Significance Criteria

APEC Level	Applicable Range Annual Average NO_2	Applicable Range PM_{10}	Recommendation
A	>5% below national objective	Annual mean: >5% below national objective	No air quality grounds for refusal, however mitigation of any emissions should be considered

[13] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.
[14] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

APEC Level	Applicable Range Annual Average NO_2	Applicable Range PM_{10}	Recommendation
		24-hour mean: >1 day less than national objective	
B	Between 5% below or above national objective	Annual mean: between 5% below or above national objective 24-hour mean: between 1 day below or above than national objective	May not be sufficient air quality grounds for refusal, however, appropriate mitigation must be considered – e.g. maximise distance from pollution source, proven ventilation systems, parking considerations, winter gardens, internal layout considered, and internal pollutant emissions minimised.
C	>5% above national objective	Annual mean: <5% above national objective 24-hour mean: >1 day more than the national objective	Refusal on air quality grounds should be anticipated unless the Local Authority has a special policy enabling such land use and ensure best endeavours to reduce exposure are incorporated. Worker exposure in commercial/ industrial land uses should be considered further. Mitigation measures must be presented with air quality assessment, detailing anticipated outcomes of mitigation measures.

Future Exposure

The proposal has the potential to expose future occupants to poor air quality. To assess pollutant concentrations across the development site, consideration was made of the proximity of the site to major roads and background pollution concentrations.

Likely pollution concentrations at the development site were compared against the relevant AQOs to determine the potential for exposure of future occupants to elevated pollutant concentrations and identify any appropriate mitigation, if necessary.

5. Assessment

Construction Phase Fugitive Dust Emissions

Step 1

The undertaking of activities such as demolition, excavation, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on site and on the local road network also have the potential to result in the re-suspension of dust from highway surfaces.

The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

Receptors sensitive to potential dust impacts during demolition, earthworks and construction were identified from a desk top study of the area up to 350m from the development boundary. These are summarised in Table 18.

Table 18: Demolition, Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	1-10	0
Less than 50	10-100	0
Less than 100	10-100	-
Less than 250	More than 100	-

Receptors sensitive to potential dust impacts from trackout were identified from a desk top study of the area up to 50m from the road network within 500m of the site access. These are summarised in Table 19.

Table 19: Trackout Dust Sensitive Receptors

Distance from Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	More than 100	0
Less than 50	More than 100	0

There are no ecological receptors within 50m of the development boundary or the access route within 500m of the site entrance. As such, ecological impacts have not been assessed further within this report.

Several additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 20.

Table 20: Additional Area Sensitivity Factors to Potential Dust Impacts

Guidance	Comment
Whether there is any history of dust generating activities in the area	The desk top study did not indicate any dust generating activities in the local area
The likelihood of concurrent dust generating activity on nearby sites	A review of the planning portal did not indicate any additional development proposals likely to result in concurrent dust generation in the vicinity of the site.
Pre-existing screening between the source and the receptors	There is no pre-existing screening between the site and surrounding receptors
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	As shown in Figure 3, the predominant wind bearing at the site is from the southwest. As such, receptors to the northeast are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, it is possible that it will extend over one year
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment

Based on the criteria shown in Table 8 the sensitivity of the receiving environment to potential dust impacts was determined as **high**. This was because the identified receptors included residential properties. It should be noted that all receptors were assumed to be of **high** sensitivity to provide a robust assessment.

The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 4, is shown in Table 21.

Table 21: Sensitivity of the Surrounding Area to Potential Dust Impacts

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium	High
Human Health	Low	Low	Low	Medium

The potential risk of dust impacts at the identified receptors is considered in the following Sections.

Step 1

The undertaking of activities such as demolition, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on site and on the local road network also have the potential to result in the re-suspension of dust from haul roads and highway surfaces.

The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

The desk-study undertaken to inform the baseline identified several sensitive receptors within 250m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

Step 2

Demolition

Table 22 shows the evaluation of the potential magnitude of impacts from demolition activities.

Table 22: Demolition Impact Magnitude

Category	Criteria	Evaluation
Large	Total volume of building to be demolished greater than 50,000m^3	No
	Potentially dusty material (e.g., concrete)	
	On-site crushing and screening	
	Demolition activities more than 20m above ground level	
Medium	Total volume of building to be demolished between 20,000m^3 and 50,000m^3	No
	Potentially dusty construction material	
	Demolition activities 10m to 20m above ground level	
Small	Total volume of building to be demolished less than 20,000m^3	Yes
	Construction material with low potential for dust release (e.g., metal cladding or timber)	
	Demolition activities less than 10m above ground	
	Demolition during wetter months	

The potential magnitude of impacts from demolition activities is estimated to be **small**.

Earthworks

Table 23 show the evaluation of the potential magnitude of impacts from earthworks.

Table 23: Earthworks Impact Magnitude

Category	Criteria	Evaluation
Large	Total site area greater than 10,000m^2	Yes
	Potentially dusty soil type (e.g., clay, which will be prone to suspension when dry due to small particle size)	
	More than 10 heavy earth moving vehicles active at any one time	
	Formation of bunds greater than 8m in height	
	Total material moved is greater than 100,000 tonnes	
Medium	Total site area 2,500m^2 to 10,000m^2	Yes
	Moderately dusty soil type (e.g., silt)	
	5 to 10 heavy earth moving vehicles active at any one time	
	Formation of bunds 4m to 8m in height	
	Total material moved is between 20,000 tonnes and 100,000 tonnes	
Small	Total site area less than 2,500m^2	Yes
	Soil type with large grain size (e.g., sand)	
	Less than 5 heavy earth moving vehicles active at any one time	
	Formation of bunds less than 4m in height	
	Total material moved is less than 20,000 tonnes	
	Earthworks during wetter months	

The potential magnitude of impacts from earthworks activities is estimated to be **large**.

Construction

Table 24 show the evaluation of the potential magnitude of impacts from construction activities.

Table 24: Construction Impact Magnitude

Category	Criteria	Evaluation
Large	Total building volume greater than 100,000m^3	Yes
	On site concrete batching	
	Sandblasting	
Medium	Total building volume 25,000m^3 to 100,000m^3	Yes
	Potentially dusty construction material (e.g., concrete)	
	On site concrete batching	
Small	Total building volume less than 25,000m^3	Yes
	Construction material with low potential for dust release (e.g., metal cladding or timber)	

The potential magnitude of impacts from construction activities is estimated to be **medium**.

Trackout

Table 25 show the evaluation of the potential magnitude of impacts from trackout.

Table 25: Trackout Impact Magnitude

Category	Criteria	Evaluation
Large	More than 50 HDV trips per day	Yes
	Potentially dusty surface material (e.g., high clay content)	
	Unpaved road length greater than 100m	
Medium	10 to 50 HDV trips per day	Yes
	Moderately dusty surface material (e.g., high clay content)	
	Unpaved road length 50m to 100m	
Small	Less than 10 HDV trips per day	Yes
	Surface material with low potential for dust release	
	Unpaved road length less than 50m	

The potential magnitude of impacts from trackout is estimated to be **large**.

Summary of Potential Unmitigated Dust Risks

A summary of the risk from each dust generating activity is provided in Table 26.

Table 26: Summary of Potential Unmitigated Dust Risks

Potential Impact	Risk				
	Demolition	Earthworks	Construction	Trackout	Overall
Magnitude/ Sensitivity	Large	Large	Medium	Large	
Dust Soiling	Low	Medium	Medium	High	High
Human Health	Negligible	Low	Low	Medium	Medium
Overall					**High**

It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the site boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during most of the construction phase.

Step 3

The Mayor of London's guidance[15] provides potential mitigation measures to reduce impacts because of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 27.

These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan or similar if required by the LA.

Table 27: Fugitive Dust Emission Mitigation Measures

Issue / Control Measure	Site Risk		
	Low	Medium	High
General			
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	-	Committed	
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager	Committed		
Display the head or regional office contact information	Committed		
Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.	As required	Committed	
Site Management			
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	Committed		
Make the complaints log available to the Local Authority when asked	Committed		
Record any exceptional incidents that cause dust and/or air emissions, either on- or off site, and the action taken to resolve the situation in the logbook.	Committed		
Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the offsite transport/ deliveries which might be using the same strategic road network routes.	As required		Committed
Monitoring			
Undertake daily onsite and offsite inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the Local Authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars, and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.	As required		Committed
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and inspect log available to the Local Authority when asked	Committed		

[15] The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

Issue / Control Measure	Site Risk		
	Low	Medium	High
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	Committed		
Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least 3 months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks, and construction.	As required	Committed	
Preparing And Maintaining the Site			
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	Committed		
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	Committed		
Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period	As required	Committed	
Avoid site runoff of water or mud.	Committed		
Keep site fencing, barriers and scaffolding clean using wet methods.	As required	Committed	
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on site cover as described below	As required	Committed	
Cover, seed, or fence stockpiles to prevent wind whipping	As required	Committed	
Operating Vehicle/Machinery and Sustainable Travel			
Ensure all vehicles switch off engines when stationary - no idling vehicles.	Committed		
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable	Committed		
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the Local Authority, where appropriate)	As required		Committed
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	-	Committed	
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)	-	As required	Committed
Operations			
Only use cutting, grinding, or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g., suitable local exhaust ventilation systems	Committed		
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate	Committed		
Use enclosed chutes and conveyors and covered skips.	Committed		
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	Committed		

Issue / Control Measure	Site Risk		
	Low	Medium	High
Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	As required	Committed	
Waste Management			
Avoid bonfires and burning of waste materials	Committed		
Measures Specific to Demolition			
Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	As required		Committed
Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	Committed		
Avoid explosive blasting, using appropriate manual or mechanical alternatives	Committed		
Bag and remove any biological debris or damp down such material before demolition.	Committed		
Measures Specific to Earthworks			
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	-	As required	Committed
Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	-	As required	Committed
Only remove the cover in small areas during work and not all at once.	-	As required	Committed
Measures Specific to Construction			
Avoid scabbling (roughening of concrete surfaces) if possible.	As required		Committed
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	As required	Committed	
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	-	As required	Committed
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	-	As required	
Measures Specific to Trackout			
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	As required	Committed	
Avoid dry sweeping of large areas.	As required	Committed	
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	As required	Committed	
Inspect on site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	-	Committed	
Record all inspections of haul routes and any subsequent action in a site logbook.	As required	Committed	
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	-	Committed	

Issue / Control Measure	Site Risk		
	Low	Medium	High
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	As required	Committed	
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	-	Committed	
Access gates to be located at least 10 m from receptors where possible.	-	Committed	

Step 4

Assuming the relevant mitigation measures outlined in Table 27 are implemented, the residual impacts from all dust generating activities are predicted to be **not significant**, in accordance with the IAQM guidance[16].

Operational Phase Road Vehicle Exhaust Emission Assessment

Future Impacts

The client has confirmed the following:

1. There will not be a change in more than 100 LDV AADT flows on local roads with relevant receptors.

2. There will not be a change in more than 25 HDV AADT flows on local roads with relevant receptors.

3. There are no plans to change in the alignment of roads by 5m or more, and the roads are not within an AQMA.

4. There are no plans to introduce a new junction or remove an existing junction near to relevant receptors.

5. There are no plans to introduce or change a bus station where bus flows will change by more than 25 AADT.

6. There will not be an underground car park with an extraction system within 20 m of a relevant receptor, coupled with the car park having more than 100 movements per day (total in and out).

7. There will not be one or more substantial combustion processes, where there is a risk of impacts at relevant receptors.

In accordance with the IAQM indicative criteria an air quality assessment of operation phase road traffic emissions is not required, and impacts are considered **not significant**.

[16] Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2017.

Future Exposure

Annual mean NO_2 and PM_{10} concentrations at the façade(s) of the development were estimated using dispersion modelling.

Table 28: 2019 Predicted annual mean NO_2 and PM_{10} concentrations (Fitzjohn Avenue)

Receptor	X(m)	Y(m)	Z(m)	Total NO_2 (µg/m^3)	Total PM_{10} (µg/m^3)
North east façade GF	526549	185028	1.5	34.0	19.1
South east façade GF	526550	185006	1.5	34.1	19.1
North west façade GF	526451	185006	1.5	28.5	18.7
South west façade GF	526452	184954	1.5	32.5	18.7
North east façade floor 1	526549	185028	4.5	32.9	18.9
South east façade floor 1	526550	185006	4.5	32.9	18.9
North west façade floor 1	526451	185006	4.5	28.4	18.6
South west façade floor 1	526452	184954	4.5	32.4	18.6
North east façade floor 2	526549	185028	7.5	31.2	18.6
South east façade floor 2	526550	185006	7.5	31.2	18.6
North west façade floor 2	526451	185006	7.5	28.3	18.5
South west façade floor 2	526452	184954	7.5	32.4	18.5

Table 29: 2019 Predicted annual mean NO_2 and PM_{10} concentrations (Maresfield Gardens)

Receptor	X(m)	Y(m)	Z(m)	Total NO_2 (µg/m^3)	Total PM_{10} (µg/m^3)
North east façade GF	526494	185033	1.5	29.3	19.1
South east façade GF	526494	185026	1.5	29.3	19.1
North west façade GF	526451	185009	1.5	28.5	18.2
South west façade GF	526450	185030	1.5	28.4	18.2
North east façade floor 1	526494	185033	4.5	29.2	18.9
South east façade floor 1	526494	185026	4.5	29.2	18.9
North west façade floor 1	526451	185009	4.5	28.4	18.2
South west façade floor 1	526450	185030	4.5	28.4	18.2
North east façade floor 2	526494	185033	7.5	29.0	18.6
South east façade floor 2	526494	185026	7.5	29.0	18.6
North west façade floor 2	526451	185009	7.5	28.3	18.2
South west façade floor 2	526450	185030	7.5	28.3	18.2

2019 predicted annual mean NO_2 and PM_{10} concentrations at the development site were all below respective AQOs of 40 µg/m^3. Based on the assessment results, future occupant exposure to exceedances of the AQOs is therefore unlikely.

The highest modelled predicted concentration for both NO2 and PM10 is over 5% below the national objective and therefore according to the London Councils Significance Criteria there is no air quality grounds for refusal, however mitigation of any emissions should be considered.

Operation Phase Mitigation

The London Councils Air Quality and Planning guidance[17] document contains mitigation measures which should be considered through careful design of the development and offsetting measures. These include, but are not limited to:

- Construction phase
  - Emissions and dust from the demolition and construction phase of a development can have a significant impact on local air quality, especially from large developments where this phase can take many years. 'The Control of Dust and Emissions from Construction and Demolition' guidance was adopted in partnership between London Councils and the Mayor of London in 2006. Borough's can follow this in the planning process to help minimise the impact from fugitive dust emissions and vehicle exhausts.

- Design of the development
  - The design of the development should have a bearing on the overall impact that it would have on the environment.
  - Careful consideration should be given to the site characteristics of the development, as particular elements of a scheme may be more sensitive to air pollution than others
  - Ventilation provisions and location of opening windows and doors should be considered to improve indoor air quality.
- Building emissions
  - The Mayor of London's SPG on Sustainable Design and Construction include a number of requirements that developers should meet, where possible, which falls under the following three categories:
    - Energy efficiency
    - Renewable energy
    - Supply of energy
- Travel plans
  - All new developments should make provisions to encourage cycling and walking and wherever possible, seek submission of Travel Plans that encourage staff and visitors to use more sustainable modes of transport rather than rely on car use.
- Use of clean/ alternatively fueled vehicles
  - Promote the provision of refueling for alternative fuels.
  - Install electric vehicle charging points in car parks
- Low emission schemes and strategies
  - All reasonable means to minimize emissions from a scheme should be adopted.
- Air quality monitoring
  - Additional air quality monitoring may be undertaken to monitor emissions or concentrations of pollutants at off site locations.

[17] London Council 2007 *Air Quality and Planning guidance*

Consideration should be also be given to *'Manual B – Minimising air pollution from new developments'* [18]This guidance covers five main areas which can be used to design a low pollution building:

1. Legislation and regulations, which explains how the Building Regulations and local air pollution regulations interact
2. The key steps to designing in energy efficiency
3. Some simple methods that can be used to estimate heating and cooling demand after an energy efficient design has been agreed
4. Heat and energy services, how much they pollute and which to use
5. The main types of boiler and heating controls which should be used to ensure the heat and energy services are used optimally and efficiently.

[18] Camden Council 2013 *Manual B – Minimising air pollution from new developments*

6. Air Quality Neutral Statement

Introduction

Per London Plan Policy SI1 Improving Air Quality Part B(2)(a) and Part E, all development, unless specifically excluded, is required to submit an Air Quality Neutral Assessment (AQN Assessment) demonstrating how Air Quality Neutral benchmarks will be met.

An Air Quality Neutral development is one that meets, or improves upon, the Air Quality Neutral benchmarks set out in the adopted Air Quality Neutral guidance[19]. These benchmarks set out the maximum allowable emissions of NO_x and particulate matter based on the size and use class of the proposed development. These benchmarks are based on research and evidence carried out by building and transport consultants and are designed to prevent the degradation of air quality from the combined emissions of individual developments.

There are two sets of benchmarks, which cover the two main sources of air pollution from new developments:

1. Building Emissions Benchmark (BEB)
    - emissions from equipment used to supply heat and energy to the buildings.

2. Transport Emissions Benchmark (TEB)
    - emissions from private vehicles travelling to and from the development.

Where applicable, a development must meet both benchmarks separately in order to be Air Quality Neutral. If one or both benchmarks are not met, appropriate mitigation or offsetting will be required.

Excluded Development

Developments, including major developments which do not include additional emissions sources are assumed to be Air Quality Neutral and to meet the Air Quality Neutral benchmarks. As such, they do not need an Air Quality Neutral assessment.

The proposed development has been screened against the following criteria to determine if it is an Excluded Development:

Table 30: Excluded Development Criteria

Criteria	Evaluation (Yes/No)
Has no additional motor vehicle parking (beyond the provision for disabled persons)[20]	Yes
Does not lead to an increase in motor vehicle movements[21]	Yes

[19] London Plan Guidance Air Quality Neutral, Greater London Authority, February 2023.
[20] Developments that are defined as 'car-free' may include provision for disabled persons parking.
[21] Taxi, delivery, and servicing vehicle trips, as well as heavy vehicle trips produced by the operation of an industrial or commercial premises are not covered by Air Quality Neutral.

Criteria	Evaluation (Yes/No)
Does not include new combustion plant, such as gas-fired boilers	Yes

As the proposed development meets the Excluded Development criteria, it is assumed to be Air Quality Neutral.

Material and non-material amendments

Changes to the design, energy, or transport strategy after planning permission has been granted may affect whether the development is Air Quality Neutral. A reassessment will be required for amendments to a planning consent that affect any of the following:

- energy strategy
- the proposed type or number of power and/or heating appliances
- transport strategy and/or travel plan
- number of parking spaces
- parking management plan
- number of residential units
- floorspace assigned to non-residential use classes

7. Conclusion

This report has been prepared to support the planning application at 39a Fitzjohn Avenue, London and land adjacent to 46 Maresfield Gardens, London.

The proposals have the potential to cause air quality impacts because of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation, as well as expose future occupants to any existing air quality issues. As such, an air quality assessment was required to determine baseline conditions and assess potential effects because of the scheme.

During the construction phase of the development there is the potential for air quality impacts because of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by demolition, earthworks, construction and trackout was predicted to be **not significant**.

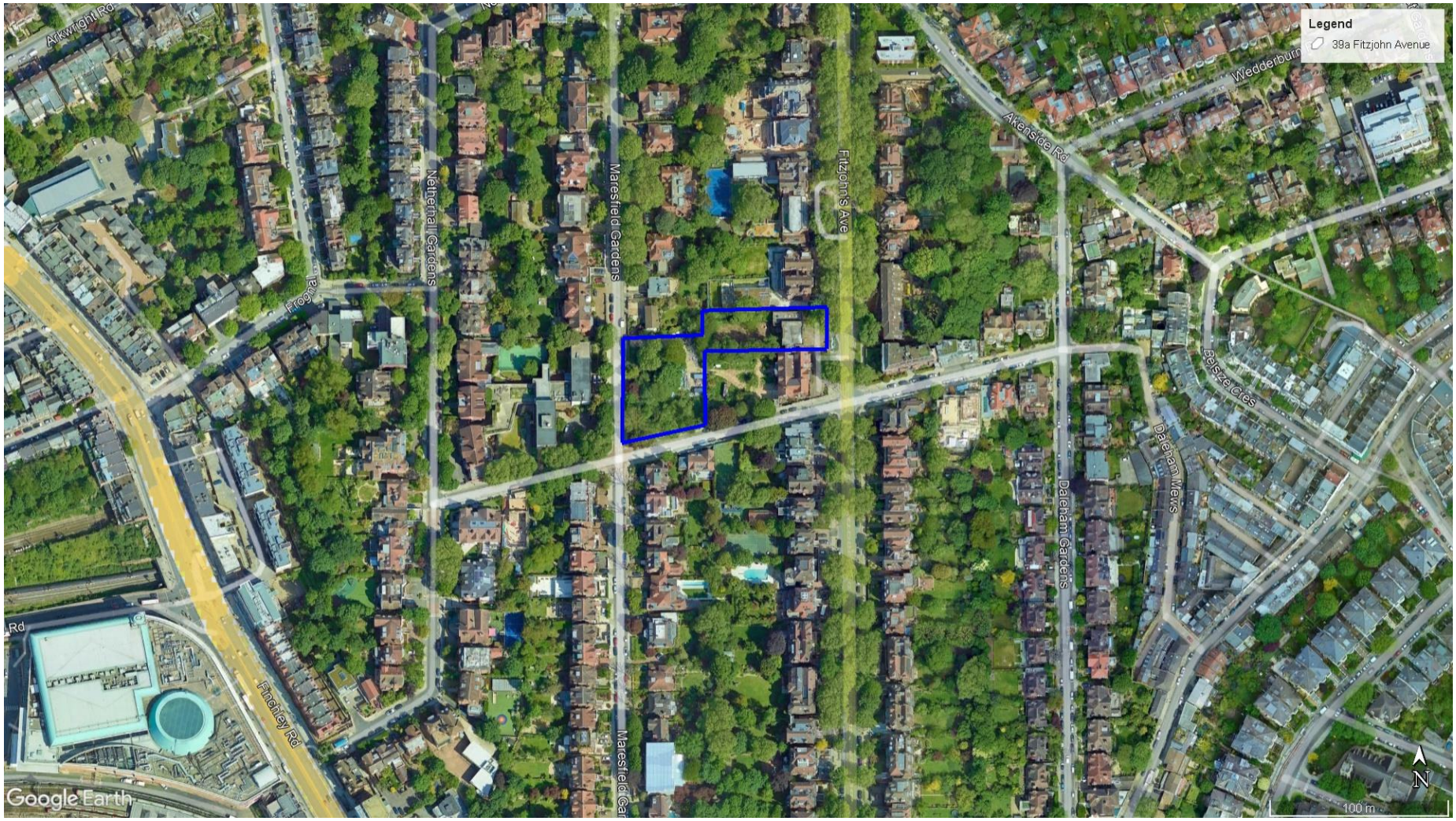
During the operational phase of the development there is the potential for air quality impacts because of traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed against the screening criteria provided within IAQM guidance. Due to the size and nature of the proposals, road vehicle exhaust emissions impacts were predicted to be **not significant.**

The proposed development has the potential to expose future users to elevated pollution levels in the vicinity of the site during operation. Local monitoring results indicate that future users are **unlikely** to be exposed to pollutant concentrations that exceed AQOs.

Based on the assessment results, air quality factors are not considered a constraint to planning consent for the development.

8. Figures

Figure 1: Site Location



mail@syntegragroup.com
Tel: 0330 053 6774

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Registered Company No. 06408056
VAT Registration No. 980016044
BSI Certificate Number FS 710041

Figure 2: Monitored Sites

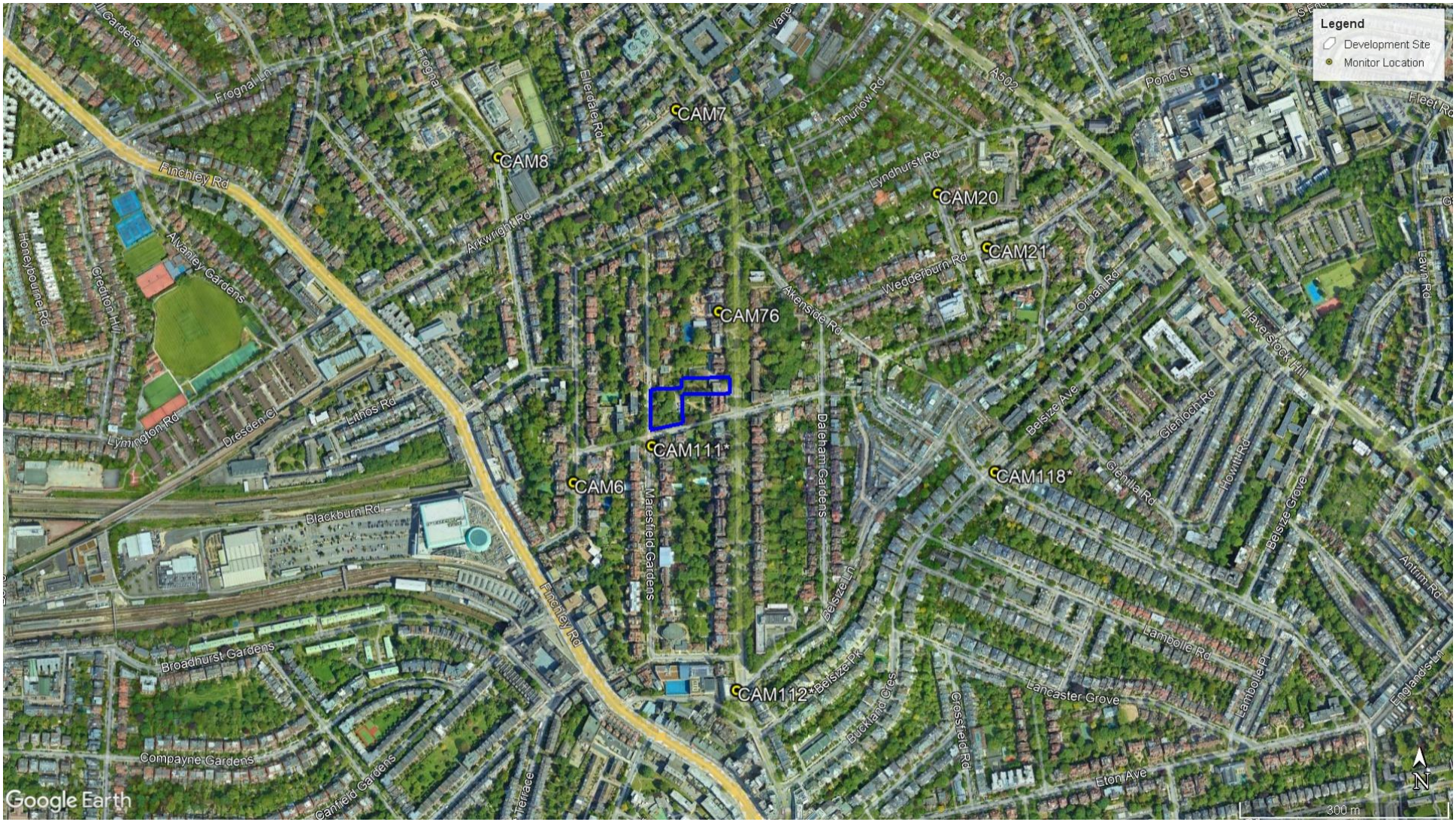
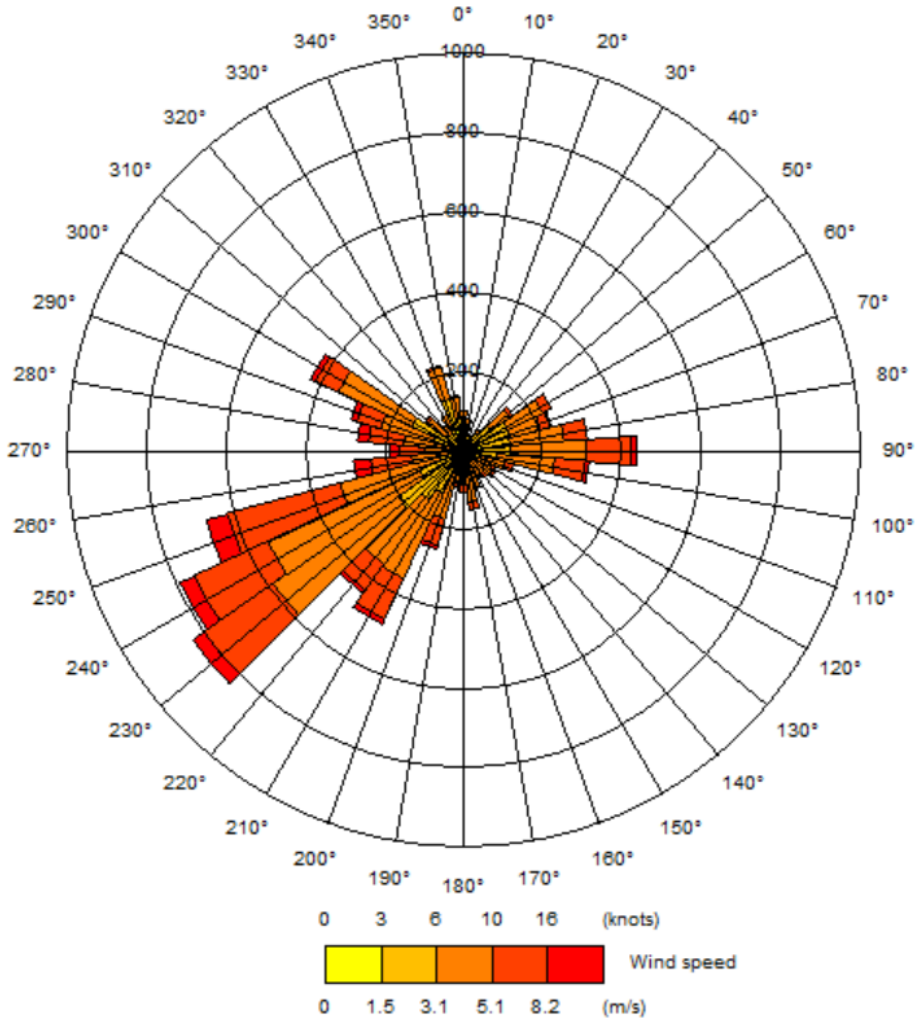


Figure 3: Meteorological Wind Rose (London City Airport 2019)



9. Appendix

Modelled Network

The modelled network is shown in Figure 4.

Figure 4: Modelled Network

Model Verification

The predicted results from a dispersion model may differ from measured concentrations for a number of reasons, including:

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and
- Uncertainties associated with monitoring data, including locations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. The differences between modelled and monitored results are likely to be a combination of all of these aspects.

Model verification was undertaken as per the methodology outlined in Defra's LAQM (TG22). For the purpose of this assessment model verification was undertaken for 2019 using traffic data, meteorological data and monitoring results from this year.

An evaluation of model performance has been undertaken to establish confidence in model results. LAQM.TG(22) identifies several statistical procedures that are appropriate to evaluate model performance and assess the uncertainty. The statistical parameters used in this assessment are:

- Root mean square error (RMSE);

- Fractional Bias (FB); and
- Correlation Coefficient (CC)

A brief explanation of each statistic is provided in Table 31 and further details can be found in LAQM.TG(22) Box A3.7.

Table 31: Model Performance Statistics

Statistical Parameter	Comments	Ideal Value
RMSE	RMSE is used to define the average error or uncertainty of the model. If the RMSE values are higher than 25% of the objective being assessed, it is recommended that the model inputs and verification should be revisited in order to make improvements. For example, if model predictions are of an annual mean NO_2 objective of 40 µg/m^3 and the RMSE is 10 µg/m^3 or above, it is advised to revisit the model parameters and model verification. Ideally an RMSE within 10% of the air quality objective would be derived, which equates to 4µg/m^3 for the annual mean NO_2 objective.	0.00
FB	It is used to identify if the model shows a systematic tendency to over or under predict. FB values vary between +2 and -2 and has an ideal value of zero. Negative values suggest a model over-prediction and positive values suggest a model under-prediction.	0.00
CC	It is used to measure the linear relationship between predicted and observed data. A value of zero means no relationship and a value of 1 means absolute relationship. This statistic can be particularly useful when comparing a large number of model and observed data points.	1.00

These parameters estimate how the model results agree or diverge from observations.

These calculations have been conducted prior to, and after, model adjustment and provide information on the improvement of the model predictions because of the application of the adjustment factor. The verification process involves a review of the annual mean modelled pollutant concentrations against corresponding monitoring data to determine how closely the air quality model agrees.

The acceptable limits of model verification are set out in LAQM.TG (22). Depending on the outcome it may be considered that there is no need to adjust any of the modelled results.

Alternatively, the model may not correlate against the monitoring data. There is then a need to check all the input data to ensure that it is reasonable and accurately represented in the air quality modelling process.

Where all input data, such as traffic data, emissions rates, and background concentrations have been checked and considered reasonable, a model can be adjusted to better agree with locally monitored data.

This may either be a single adjustment factor to be applied to modelled concentrations across the study area, or a range of different adjustment factors to account for different zones in the study area e.g., motorways, local roads. Two suitable monitoring locations were selected (CAM76 and CAM7) and used in the verification process, considering the site types, position of the diffusion tubes and representation of local air quality environment. These sites were chosen as they are roadside diffusion tubes. CAM112 and CAM118 were not included as the monitoring at these locations were undertaken by a community project and the % data capture for 2019 is not known.

Table 32 shows that there was a systematic under prediction of monitored concentrations at the diffusion tubes. It was therefore considered necessary to adjust modelled concentrations.

Table 32: Verification, Unadjusted Modelled vs. Monitoring Data

ID	2019 Monitored Annual Mean NO_2	2019 Modelled Annual Mean NO_2	Unadjusted % (Modelled-Monitored)/ Monitored
CAM76	43.5	28.50	-34.50
CAM7	39.5	28.51	-27.82

Table 33 shows the comparison of modelled road-NOx, a direct output from the ADMS-Roads modelling, with the monitored road-NOx, determined from the LAQM NOx to NO_2 conversion tool. A adjustment factor determined by regression, of 7.4018 was used to adjust modelled results.

Table 33: Comparison of Modelled and Monitored Road NOx

ID	2019 Monitored Annual Mean Road NOx	2019 Modelled Annual Mean Road-NOx	Ratio
CAM76	39.81	4.69	8.5
CAM7	29.74	4.71	6.3
Adjustment Factor	7.4018		

Table 34 shows the comparison of the modelled NO_2 concentration calculated by multiplying the modelled road NOx by the adjustment factor of 7.4018 and using the LAQM NO_X to NO_2 conversion tool to calculate the total adjusted modelled NO_2.

Table 34: Comparison of Modelled and Monitored Road NOx

ID	2019 Annual Mean Background NO_2 Concentrations	2019 Adjusted Modelled Annual Mean NO_2	2019 Monitored Annual Mean NO_2	% (Modelled-Monitored/Monitored)
CAM76	26.3	41.5	43.5	-5%
CAM7	26.3	41.6	39.5	5%

The model performance statistics show that after adjustment the residual uncertainty in the predictions of total annual mean NO_2 was less than 25% (RMSE of 2.0401).

In line with LAQM TG(22), statistical procedures (explained in Table 31) have been carried out to assess the uncertainties within the model, as shown in Table 35.

Table 35: Assessment of Model Uncertainty

Statistical Parameter	Calculated Value
RMSE	2.0401
FB	0
CC	1.000